

Table 4.18:
California Regression Models: Staff Retention Percentage, Direct Nursing Care Staff, 1999

Variable	Parameter Estimate	Standard Error	T statistic
Intercept	26.82 ***	4.18	6.41
Total nursing hours per resident day	0.46	0.46	1.01
100 or more beds	24.11 ***	0.93	25.98
200 or more beds	40.52 ***	2.28	17.74
Average wage rate: Second quartile	0.12	1.13	0.10
Average wage rate: Third quartile	1.48	1.19	1.25
Average wage rate: Top quartile	3.29 **	1.42	2.31
Fringe benefit percentage: Second quartile	4.45 ***	1.13	3.94
Fringe benefit percentage: Third quartile	5.63 ***	1.18	4.79
Fringe benefit percentage: Top quartile	7.05 ***	1.22	5.78
For-profit facility	-0.95	1.31	-0.72
Chain facility	-0.01	0.97	-0.01
Urban county	0.46	2.15	0.22
Adjacent to urban county	1.98	2.89	0.69
County unemployment rate: Second quartile	2.33	1.84	1.27
County unemployment rate: Third quartile	-4.73	3.99	-1.19
County unemployment rate: Top quartile	-1.60	8.00	-0.20
Per capita income: Second quartile	-5.46	3.69	-1.48
Per capita income: Third quartile	10.81	5.20	-2.08
Per capita income: Top quartile	-7.88	4.32	-1.82

Notes: N= 1,129 R-squared: 0.484

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level,

*: Statistically significant at 10 percent level;

Sources: State of California, Office of Statewide Health Planning and Development, Long-Term Care Facility Annual Financial Data, 1999

Table 4.19:
California Regression Models: Staff Retention Percentage, Nurse Aides, 1999

Variable	Parameter Estimate	Standard Error	T statistic
Intercept	13.24 ***	3.10	4.27
Nurse aide hours per resident day	1.18 **	0.55	2.13
100 or more beds	15.77 ***	0.67	23.58
200 or more beds	31.25 ***	1.51	20.72
Nurse aide wage: Second quartile	1.35	0.83	1.63
Nurse aide wage: Third quartile	1.53 *	0.91	1.68
Nurse aide wage: Top quartile	2.17 **	1.09	1.99
Fringe benefit percentage: Second quartile	2.65 ***	0.82	3.24
Fringe benefit percentage: Third quartile	3.94 ***	0.86	4.59
Fringe benefit percentage: Top quartile	5.13 ***	0.90	5.73
For-profit facility	0.33	0.96	0.34
Chain facility	0.15	0.70	0.22
Urban county	-0.01	1.57	-0.01
Adjacent to urban county	0.02	2.11	0.01
County unemployment rate: Second quartile	1.37	1.35	1.02
County unemployment rate: Third quartile	-1.74	2.90	-0.60
County unemployment rate: Top quartile	-0.42	5.89	-0.07
Per capita income: Second quartile	-2.60	2.70	-0.96
Per capita income: Third quartile	-5.28	3.84	-1.38
Per capita income: Top quartile	-4.06	3.19	-1.27

Notes: N= 1,155 R-squared: 0.464

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: State of California, Office of Statewide Health Planning and Development, Long-Term Care Facility Annual Financial Data, 1999

Facility Case Mix (Workload)

There was no relationship between facility case mix and turnover and retention for either all direct nursing staff or the subset of nurse aides (see Tables 4.20 – 4.24). This may be due to measurement error in both the MDS (used to calculate the workload score) and facility turnover statistics. It may also be because the facility workload score is poorly correlated with the amount or difficulty of work required from nurses. In any case, we were not able to detect any relationship between case mix and turnover, even for models (not reported) that excluded the independent variables related to staffing level. (since staffing levels tended to be somewhat higher for facilities that had higher workload scores). The California regression results do not support the hypothesis that facility case mix is related to turnover and retention, at least not after adjusting for facility staffing levels and the other independent variables included in the models.

Table 4.20:
California Regression Models: Turnover Percentage, Direct Nursing Care Staff, with Facility Workload, 1999

Variable	Parameter Estimate	Standard Error	T statistic
Intercept	48.08 ***	16.12	2.98
Total nursing hours per resident day	0.22	1.93	0.11
100 or more beds	-11.68 ***	3.11	-3.76
200 or more beds	-13.08 **	6.19	-2.11
Average wage rate: Second quartile	0.80	3.74	0.21
Average wage rate: Third quartile	-3.50	4.04	-0.87
Average wage rate: Top quartile	-5.53	4.90	-1.13
Fringe benefit percentage: Second quartile	-9.44 **	3.72	-2.54
Fringe benefit percentage: Third quartile	-11.95 ***	3.85	-3.10
Fringe benefit percentage: Top quartile	-17.41 ***	4.12	-4.22
For-profit facility	17.83 ***	4.43	4.03
Chain facility	0.78	3.29	0.24
Urban county	3.18	7.58	0.42
Adjacent to urban county	11.77	9.88	1.19
County unemployment rate: Second quartile	2.78	6.73	-0.41
County unemployment rate: Third quartile	5.97	13.69	0.44
County unemployment rate: Top quartile	-47.13	37.76	-1.25
Per capita income: Second quartile	24.49 **	12.49	1.96
Per capita income: Third quartile	19.71	17.45	1.13
Per capita income: Top quartile	25.37 *	14.86	1.71
Average facility workload	2.07	3.46	0.60

Notes: N= 780 R-squared: 0.109

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: *State of California, Office of Statewide Health Planning and Development, Long-Term Care Facility Annual Financial Data, 1999*

Table 4.21:
California Regression Models: Turnover Percentage, Nurse Aides, with Facility Workload, 1999

Variable	Parameter Estimate	Standard Error	T statistic
Intercept	54.45 ***	19.21	2.84
Nurse aide hours per resident day	-2.63	4.00	-0.66
100 or more beds	-11.05 ***	3.55	-3.11
200 or more beds	-15.99 **	7.21	-2.22
Nurse aide wage: Second quartile	-7.14	4.38	-1.63
Nurse aide wage: Third quartile	-10.50 **	4.91	-2.14
Nurse aide wage: Top quartile	-15.81 ***	5.95	-2.66
Fringe benefit percentage: Second quartile	-13.86 **	4.29	-3.23
Fringe benefit percentage: Third quartile	-13.53 ***	4.50	-3.01
Fringe benefit percentage: Top quartile	-19.47 ***	4.82	-4.04
For-profit facility	17.51 ***	5.20	3.37
Chain facility	-1.59	3.84	-0.41
Urban county	13.05	8.74	1.49
Adjacent to urban county	16.71	11.46	1.40
County unemployment rate: Second quartile	-3.43	7.82	-0.44
County unemployment rate: Third quartile	6.06	15.85	0.38
County unemployment rate: Top quartile	-35.36	44.10	-0.80
Per capita income: Second quartile	36.22 **	14.64	2.48
Per capita income: Third quartile	29.80	20.67	1.44
Per capita income: Top quartile	35.54 **	17.51	2.03
Average facility workload	3.24	3.99	0.81

Notes: N= 792 R-squared: 0.0106

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: State of California, Office of Statewide Health Planning and Development, Long-Term Care Facility Annual Financial Data, 1999

Table 4.22:
California Regression Models: Staff Retention Percentage, Direct Nursing Care Staff, with Facility Workload, 1999

Variable	Parameter Estimate	Standard Error	T statistic
Intercept	16.25 ***	5.81	2.80
Total nursing hours per resident day	2.89 ***	0.70	4.14
100 or more beds	22.63 ***	1.12	20.23
200 or more beds	40.00 ***	2.55	15.68
Average wage rate: Second quartile	1.13	1.35	0.84
Average wage rate: Third quartile	2.36	1.45	1.62
Average wage rate: Top quartile	4.59 ***	1.77	2.59
Fringe benefit percentage: Second quartile	3.74 ***	1.34	2.80
Fringe benefit percentage: Third quartile	5.31 ***	1.39	3.81
Fringe benefit percentage: Top quartile	5.75 ***	1.49	3.87
For-profit facility	0.95	1.61	0.59
Chain facility	-1.71	1.19	-1.43
Urban county	0.74	2.72	0.27
Adjacent to urban county	2.24	3.55	0.63
County unemployment rate: Second quartile	0.41	2.41	0.17
County unemployment rate: Third quartile	-3.23	4.91	-0.66
County unemployment rate: Top quartile	11.58	13.51	-0.86
Per capita income: Second quartile	-3.43	4.49	-0.76
Per capita income: Third quartile	-8.30	6.30	-1.32
Per capita income: Top quartile	-5.92	5.34	-1.11
Average facility workload	1.04	1.26	0.83

Notes: N= 768 R-squared: 0.482

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: State of California, Office of Statewide Health Planning and Development, Long-Term Care Facility Annual Financial Data, 1999

Table 4.23:**California Regression Models: Staff Retention Percentage, Nurse Aides, with Facility Workload, 1999**

Variable	Parameter Estimate	Standard Error	T statistic
Intercept	6.23	4.34	1.44
Nurse aide hours per resident day	3.58 ***	0.90	3.97
100 or more beds	14.94 ***	0.80	18.67
200 or more beds	31.44 ***	1.69	18.59
Nurse aide wage: Second quartile	0.91	0.99	0.92
Nurse aide wage: Third quartile	2.70 **	1.11	2.44
Nurse aide wage: Top quartile	2.32 *	1.34	1.73
Fringe benefit percentage: Second quartile	2.19 **	0.97	2.27
Fringe benefit percentage: Third quartile	4.09 ***	1.02	4.02
Fringe benefit percentage: Top quartile	4.56 ***	1.09	4.18
For-profit facility	2.27 *	1.18	1.93
Chain facility	-1.03	0.86	-1.19
Urban county	0.54	1.97	0.27
Adjacent to urban county	0.89	2.58	0.35
County unemployment rate: Second quartile	-0.50	1.76	-0.29
County unemployment rate: Third quartile	-0.85	3.57	-0.24
County unemployment rate: Top quartile	11.15	9.93	-1.12
Per capita income: Second quartile	-1.12	3.30	-0.34
Per capita income: Third quartile	-3.64	4.66	-0.78
Per capita income: Top quartile	-2.69	3.95	-0.68
Average facility workload	0.25	0.91	0.27

Notes: N= 789 R-squared: 0.471

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: State of California, Office of Statewide Health Planning and Development, Long-Term Care Facility Annual Financial Data, 1999

Kansas

Similar to the California models, the statistical performance of the Kansas regression models was rather modest—the models accounted for 27 percent of the variance in overall nursing staff turnover. The models performed better in accounting for variance in nurse aide turnover than turnover for RNs or LPNs.

Wage and Benefit Levels

There was no relationship between hourly wage rates and turnover, either overall (Table 4.24) or separately for RNs (Table 4.25), LPNs (Table 4.26), or nurse aides (Table 4.27). Benefit levels, however, were strongly related to turnover. Among all staff, turnover for facilities in the third benefit quartile was 23 percent lower than for facilities in the lowest

quartile; turnover for the highest quartile was 18 percent lower (Table 4.24). This relationship was due to the sensitivity of nurse aide turnover to benefit levels. Turnover for facilities in the third highest benefit quartile had nurse aide turnover that was 24 percent lower than facilities in the lowest benefit quartile (Table 4.27). For RNs and LPNs, the relationship between benefit levels and turnover was not statistically significant.

Staffing Levels

Contrary to our expectation, there was no indication that turnover at facilities with high staffing levels was lower than turnover at lower staffed facilities. There was no significant relationship between overall staffing levels and turnover for any nurse category. For RNs, turnover was significantly lower at facilities with lower levels of RN staffing (Table 4.25). LPN turnover was significantly lower at facilities with more LPN hours per resident day, but was not significantly related to total nursing hours (Table 4.26). Among nurse aides, there was no relationship between total nursing hours per resident day and turnover (Table 4.27).

Facility Characteristics

Turnover was significantly lower at hospital based facilities, particularly for nurse aides. Nurse aide turnover was 46 percent lower at the state's hospital based facilities, other factors held constant (Table 4.27). Overall turnover was 41 percent lower at hospital-based facilities than at freestanding ones (Table 4.24). Across all nursing staff, turnover was also 29 percent higher at for-profit facilities relative to non-profit facilities, a statistically significant difference. There was no significant difference in turnover rates between chain-affiliated and independent facilities. Facility size was also not related to turnover rates for Kansas facilities—turnover rates were essentially the same at facilities with fewer than 100 beds than at larger facilities.

Local Labor Market Characteristics

There was no difference in turnover rates between urban, adjacent, or rural facilities for RNs, LPNs, or nurse aides, nor were county unemployment rates significantly related to turnover. Across all nursing staff, turnover was significantly higher (at the 5 percent level) for facilities in counties in the top quartile in terms of average per capita income relative to counties in the lowest quartile (Table 4.24). This was particularly true for LPNs—turnover at facilities in counties in the top per capita income quartile was 41 percent lower than for facilities in the lowest quartile, and this relationship was statistically significant at the 1 percent level (Table 4.26).

Facility Case Mix (Workload)

Across all facility staff, turnover was significantly higher at facilities with a higher case mix, based on the facility workload score. Given the standard deviation of the workload variable for Kansas facilities (0.5), a one standard deviation increase in the workload variable was

associated with an 8 percent increase in facility turnover, other factors held constant (Table 4.24). This overall relationship was due to the strong relationship between workload and nurse aide turnover. Among nurse aides, each one standard deviation increase in facility workload was associated with a 10 percent increase in turnover, and this relationship was statistically significant at the 5 percent level. There was no relationship between facility workload and turnover for RNs or LPNs.

Table 4.24
Regression Results: Turnover Percentage, All Nursing Staff: Kansas

Variable	Parameter Estimate	Standard Error	T Statistic
Intercept	41.10 **	19.02	2.16
Average wage rate: Second quartile	5.69	7.89	0.72
Average wage rate: Third quartile	-12.74	9.29	-1.37
Average wage rate: Top quartile	-14.26	13.16	-1.08
Fringe benefit percentage: Second quartile	-13.74 *	8.09	-1.70
Fringe benefit percentage: Third quartile	-22.66 ***	8.08	-2.80
Fringe benefit percentage: Top quartile	-18.17 **	8.13	-2.24
Total nursing hours per resident day	3.78	4.99	0.76
100 or more beds	0.22	7.72	0.03
Urban county	9.68	11.40	0.85
Adjacent to urban county	12.71	8.00	1.59
For-profit facility	19.04 ***	6.29	3.03
Chain facility	-2.83	5.89	-0.48
Hospital based facility	-28.64 **	12.58	-2.28
County unemployment rate: Second quartile	9.84	8.00	1.23
County unemployment rate: Third quartile	-7.36	7.81	-0.94
County unemployment rate: Top quartile	12.52	9.89	1.27
Per capita income: Second quartile	10.01	8.20	1.22
Per capita income: Third quartile	6.90	9.43	0.73
Per capita income: Top quartile	25.81 **	11.17	2.31
Average facility workload	16.44 ***	6.02	2.73

Notes: N= 197 R-squared: 0.267

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: Kansas Department of Aging, Medicaid Cost Report Data, 1999

Table 4.25
Regression Results: Turnover Percentage, RNs: Kansas

Variable	Parameter Estimate	Standard Error	T Statistic
Intercept	46.19 *	26.73	1.73
RN wage rate: Second quartile	-9.08	10.53	-0.86
RN wage rate: Third quartile	-5.39	11.33	-0.48
RN wage rate: Top quartile	-6.93	14.99	-0.46
Fringe benefit percentage: Second quartile	3.09	10.76	0.29
Fringe benefit percentage: Third quartile	0.18	10.54	0.02
Fringe benefit percentage: Top quartile	1.46	10.77	0.14
Total nursing hours per resident day	0.93	8.41	0.11
RN hours per resident day	-17.14	17.06	-1.01
100 or more beds	5.68	10.47	0.54
Urban county	5.66	13.53	0.42
Adjacent to urban county	18.38 *	10.10	1.82
For-profit facility	-1.94	8.71	-0.22
Chain facility	7.10	8.02	0.89
Hospital based facility	-12.63	15.36	-0.82
County unemployment rate: Second quartile	3.22	10.86	0.30
County unemployment rate: Third quartile	-6.11	10.15	-0.60
County unemployment rate: Top quartile	-6.81	13.00	-0.52
Per capita income: Second quartile	11.00	11.08	0.99
Per capita income: Third quartile	7.17	12.50	0.57
Per capita income: Top quartile	21.21	14.62	1.45
Average facility workload	0.10	8.08	0.01

Notes: N= 235 R-squared: 0.061

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: Kansas Department of Aging, Medicaid Cost Report Data, 1999

Table 4.26
Regression Results: Turnover Percentage, LPNs: Kansas

Variable	Parameter Estimate	Standard Error	T Statistic
Intercept	15.06	25.18	0.60
LPN wage rate: Second quartile	6.33	10.63	0.60
LPN wage rate: Third quartile	2.22	11.23	0.20
LPN wage rate: Top quartile	9.59	13.03	0.74
Fringe benefit percentage: Second quartile	-7.36	10.90	-0.68
Fringe benefit percentage: Third quartile	-7.24	10.69	-0.68
Fringe benefit percentage: Top quartile	-3.85	10.99	-0.35
Total nursing hours per resident day	11.05	7.40	1.49
LPN hours per resident day	-41.04 **	16.30	-2.52
100 or more beds	9.66	10.26	0.94
Urban county	-11.94	12.68	-0.94
Adjacent to urban county	-0.26	10.70	-0.02
For-profit facility	6.72	8.45	0.80
Chain facility	8.58	8.10	1.06
Hospital based facility	2.23	16.48	0.14
County unemployment rate: Second quartile	2.86	10.82	0.26
County unemployment rate: Third quartile	1.71	10.76	0.16
County unemployment rate: Top quartile	18.79	13.30	1.41
Per capita income: Second quartile	19.86 *	11.07	1.79
Per capita income: Third quartile	12.20	12.59	0.97
Per capita income: Top quartile	40.79 ***	14.27	2.86
Average facility workload	3.61	8.07	0.45

Notes: N= 200 R-squared: 0.013

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: Kansas Department of Aging, Medicaid Cost Report Data, 1999

Table 4.27**Regression Results: Turnover Percentage, Nurse Aides: Kansas**

Variable	Parameter Estimate	Standard Error	T Statistic
Intercept	57.68 **	25.61	2.25
Nurse aide wage rate: Second quartile	13.88	10.43	1.33
Nurse aide wage rate: Third quartile	-10.18	11.58	-0.88
Nurse aide wage rate: Top quartile	-18.50	18.13	-1.02
Fringe benefit percentage: Second quartile	-13.77	10.91	-1.26
Fringe benefit percentage: Third quartile	-23.66 **	10.85	-2.18
Fringe benefit percentage: Top quartile	-14.00	10.91	-1.28
Total nursing hours per resident day	-0.24	6.69	-0.04
100 or more beds	-6.99	10.63	-0.66
Urban county	23.97	17.37	1.38
Adjacent to urban county	11.37	10.55	1.08
For-profit facility	13.37	8.51	1.57
Chain facility	5.81	7.88	0.74
Hospital based facility	-45.55 ***	15.54	-2.93
County unemployment rate: Second quartile	15.56	10.84	1.44
County unemployment rate: Third quartile	-7.60	10.65	-0.71
County unemployment rate: Top quartile	12.43	13.64	0.91
Per capita income: Second quartile	2.28	11.22	0.20
Per capita income: Third quartile	-1.60	12.79	-0.13
Per capita income: Top quartile	16.01	14.31	1.12
Average facility workload	20.45 **	8.09	2.53

Notes: N= 202 R-squared: 0.223

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

*Sources: Kansas Department of Aging, Medicaid Cost Report Data, 1999***Wisconsin**

The Wisconsin data did not include either wage or benefit information, so we were not able to analyze how these factors affect turnover for Wisconsin facilities. We were, however, able to measure how measures of staffing levels, facility characteristics, and local labor market conditions affect turnover. Despite the lack of wage and benefit data, the Wisconsin models performed better than those for either California or Kansas. The overall model accounted for 29 percent of the variance in turnover in the state.

Staffing levels

In contrast to findings for Kansas, overall turnover was significantly lower at higher staffed facilities.

- Across all nursing staff, each additional nursing hour per resident day was associated with a 8 percent decrease in turnover, a statistically significant difference (Table 4.28).
- For RNs, there was no relationship between total nursing hours per resident day and turnover, but turnover was significantly lower for facilities with higher RN staffing (Table 4.29).
- There was no relationship between either LPN or total staffing and LPN turnover (Table 4.30).
- Nurse aide turnover was related to total facility staffing. Each one hour increase in total nursing hours per resident day was associated with a more than 9 percent decrease in nurse aide turnover (Table 4.31). This relationship was statistically significant at the 5 percent level.

Facility Characteristics

Consistent with results for California and Kansas, turnover was significantly higher at for-profit facilities. Among all nursing staff, turnover was 21 percent higher at for-profit facilities (Table 4.28). For nurse aides, turnover was 26 percent higher at for-profit facilities (Table 4.31). Both of these differences were statistically significant at the 1 percent level.

Overall turnover was not significantly different between facilities associated with a nursing home chain and independent facilities (Table 4.28). Among RNs, however, turnover was 14 percent higher at chains, other factors held constant (Table 4.29). There was no relationship between chain affiliation and turnover for LPNs and nurse aides.

As in California, turnover was lower at large nursing homes. Overall turnover was more than 8 percent lower at facilities with 100 or more beds than at smaller facilities, and this relationship was statistically significant at the 5 percent level (Table 4.28). Turnover for LPNs and nurse aides was significantly lower for large facilities—the largest relationship was for LPNs—LPN turnover was 13 percent lower at facilities with 100 or more beds than at smaller facilities (Table 4.30). This relationship was statistically significant at the 1 percent level. Nurse aide turnover was about 8 percent lower at facilities with 100 or more beds (Table 4.31).

Local Labor Market Characteristics

There was some evidence that turnover was lower for facilities in high unemployment counties.

- Among all nursing staff, turnover was 11 percent higher for counties in the highest unemployment rate quartile than for facilities in counties in the lowest quartile (Table 4.28).
- For nurse aides, turnover was 16 percent lower for facilities located in counties in the highest unemployment rate quartiles—this difference were statistically significant at the 10 percent level (Table 4.31).
- There was no relationship between turnover and county unemployment rates for either RNs or LPNs.

Overall turnover was more than 13 percent higher for facilities in counties in the top quartile in terms of per capita income than for counties in the lowest quartile (Table 4.28). This difference was statistically significant at the 10 percent level. For all three nursing categories, turnover was higher among facilities in high income counties, although the difference was statistically significant only for LPNs.

Facility Case Mix (Workload)

Unlike Kansas, we found no evidence of a relationship between facility case mix and turnover for Wisconsin facilities. Neither overall turnover nor turnover for the individual nurse categories was related to facility workload scores.

Table 4.28:**Regression Results: Turnover Percentage, All Nursing Staff: Wisconsin, 1999**

Variable	Parameter Estimate	Standard Error	T-statistic
Intercept	74.89 ***	15.42	4.86
Total nursing hours per resident day	-7.78 ***	2.94	-2.65
For-profit facility	20.94 ***	3.85	5.45
Urban county	4.48	7.63	0.59
Adjacent to urban county	-1.06	6.37	-0.17
More than 100 beds	-8.10 **	3.39	-2.39
Chain facility	5.11	3.66	1.40
Hospital based facility	-5.45	6.37	-0.86
County unemployment rate: Second quartile	1.82	4.11	0.44
County unemployment rate: Third quartile	-9.99	6.57	-1.52
County unemployment rate: Top quartile	-11.07 *	6.47	-1.71
Per capita income: Second quartile	-1.96	5.52	-0.36
Per capita income: Third quartile	3.19	6.51	0.49
Per capita income: Top quartile	13.49 *	7.39	1.82
Average Facility Workload	1.04	5.16	0.20

Notes: N= 364 R-squared: 0.288

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: Wisconsin Division of Health Care Financing, Bureau of Health Information, Annual Survey of Nursing Home, 1999

Table 4.29:
Regression Results: Turnover Percentage, RNs: Wisconsin, 1999

Variable	Parameter Estimate	Standard Error	T-statistic
Intercept	12.21	20.74	0.59
RN hours per resident day	-24.18 **	10.13	-2.39
Total nursing hours per resident day	8.31 *	4.89	1.70
For-profit facility	11.56 **	5.14	2.25
Urban county	1.20	10.21	0.12
Adjacent to urban county	-4.97	8.50	-0.59
More than 100 beds	-6.73	4.53	-1.49
Chain facility	13.76 ***	4.89	2.81
Hospital based facility	-4.49	8.60	-0.52
County unemployment rate: Second quartile	9.85 *	5.49	1.80
County unemployment rate: Third quartile	-1.67	8.77	-0.19
County unemployment rate: Top quartile	3.10	8.64	0.36
Per capita income: Second quartile	1.12	7.37	0.15
Per capita income: Third quartile	-0.52	8.73	-0.06
Per capita income: Top quartile	12.25	9.88	1.24
Average facility workload	0.39	6.95	0.06

Notes: N= 364 R-squared: 0.137

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: Wisconsin Division of Health Care Financing, Bureau of Health Information, Annual Survey of Nursing Home, 1999

Table 4.30 :**Regression Results: Turnover Percentage, LPNs: Wisconsin, 1999**

Variable	Parameter Estimate	Standard Error	T-statistic
Intercept	52.40 ***	18.27	2.87
LPN hours per resident day	4.86	8.17	0.60
Total nursing hours per resident day	-5.26	3.67	-1.44
For-profit facility	12.96 ***	4.51	2.87
Urban county	10.69	8.93	1.20
Adjacent to urban county	4.32	7.45	0.58
More than 100 beds	-12.79 ***	3.97	-3.22
Chain facility	0.59	4.33	0.14
Hospital based facility	-7.73	7.56	-1.02
County unemployment rate: Second quartile	-2.56	4.84	-0.53
County unemployment rate: Third quartile	-9.48	7.76	-1.22
County unemployment rate: Top quartile	-2.52	7.60	-0.33
Per capita income: Second quartile	-5.19	6.47	-0.80
Per capita income: Third quartile	-6.16	7.63	-0.81
Per capita income: Top quartile	16.74 *	8.67	1.93
Average facility workload	-4.11	6.03	-0.68

Notes: N= 363 R-squared: 0.170

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: Wisconsin Division of Health Care Financing, Bureau of Health Information. Annual Survey of Nursing Home, 1999

Table 4.31:
Regression Results: Turnover Percentage, Nurse Aides: Wisconsin, 1999

Variable	Parameter Estimate	Standard Error	T-statistic
Intercept	91.87 ***	19.78	4.65
Total nursing hours per resident day	-9.52 **	3.77	-2.52
For-profit facility	26.15 ***	4.93	5.30
Urban county	7.06	9.78	0.72
Adjacent to urban county	0.17	8.16	0.02
More than 100 beds	-8.12 *	4.35	-1.87
Chain facility	5.62	4.69	1.20
Hospital based facility	-5.55	8.16	-0.68
County unemployment rate: Second quartile	1.97	5.27	0.37
County unemployment rate: Third quartile	-13.02	8.43	-1.55
County unemployment rate: Top quartile	-15.93 *	8.29	-1.92
Per capita income: Second quartile	-2.00	7.08	-0.28
Per capita income: Third quartile	7.15	8.35	0.86
Per capita income: Top quartile	14.45	9.48	1.52
Average facility workload	-0.82	6.61	-0.12

Notes: N= 396 R-squared: 0.240

***: Statistically significant at 1 percent level

**: Statistically significant at 5 percent level;

*: Statistically significant at 10 percent level;

Sources: Wisconsin Division of Health Care Financing, Bureau of Health Information, *Annual Survey of Nursing Home*, 1999

4.7 Conclusions

This chapter analyzed 1999 nursing home turnover for three states — California, Kansas, and Wisconsin — for which facility level turnover statistics were available. Turnover was calculated by comparing the total number of employees who worked during the year to a measure of the average number of employees at a given point during the year.

Relative to other sectors of the labor force, turnover rates in all three states were high, especially for nurse aides. In two of the three states, however, turnover levels were lower than those reported in the widely cited 1998 survey reported by the American Health Care Association, based on a survey of turnover in a sample of for-profit, chain affiliated facilities (AHCA, 1998). Turnover was considerably higher in Kansas than for either Wisconsin or California. Average turnover rates for all nursing staff ranged from 63 percent in Wisconsin to 72 percent in California, and 85 percent in Kansas. Nurse aide turnover ranged from 76 percent in Wisconsin to 78 percent in California and 100 percent for Kansas. RN and LPN turnover was considerably lower — around 55 percent in Kansas and 40 percent in Wisconsin. (Note that it was not possible to calculate RN or LPN turnover for California.) In California, the only state for which it was possible to calculate staff continuity, nearly 35 percent of direct nursing staff were employed at the facility for the entire reporting period. Only 22 percent of nurse aides had continuous service throughout the year.

There was considerable variation in turnover levels across facilities. Some facilities were able to keep turnover at relatively low levels, while turnover rates at other facilities were extremely high. In California, ten percent of facilities had overall turnover of 31 percent or less, while ten percent of facilities had turnover of more than 120 percent. One-fourth of the state's facilities had nurse aide turnover of 100 percent or more, while only 25 percent of facilities had nurse aide turnover of 46 percent or less. Staff continuity was 15 percent or less for the lowest decile of facilities, compared to 61 percent for the top decile. Similar variation in turnover levels was observed for Kansas and Wisconsin. While median turnover for nurse aides in Kansas was 92 percent, 10 percent of facilities had turnover of 35 percent or less. In Wisconsin, more than 20 percent of facilities had nurse aide turnover of more than 100 percent, but 20 percent of facilities had turnover of 43 percent or less.

To understand further the factors that might contribute to this wide variation in turnover levels, we estimated a series of multivariate regression models. The independent variables in the model included measures of facility characteristics, wage and benefit levels, staffing levels, and county labor market characteristics.

Evidence was mixed regarding the impact of wage rates on turnover. Across all California direct nursing staff, wage rates were not significantly related to turnover. Among nurse aides in the state, however, turnover was significantly lower at facilities with higher nurse aide wage rates. Relative to facilities in the lowest wage rate quartile, turnover was more than 10 percent lower for facilities in the third quartile and 19 percent lower for facilities in the highest quartile. Both of these differences were statistically significant at the 1 percent level. For Kansas facilities, there was no relationship between hourly wage rates and turnover for RNs, LPNs, or nurse aides. No wage rate data were available for Wisconsin.

Benefit levels appeared to impact turnover much more than wage rates. For both California and Kansas, turnover was significantly lower in facilities with greater benefit expenditures. In California, nurse aide turnover was 18 percent lower for facilities in the highest benefit quartile than for facilities in the lowest quartile, and was 10 percent lower for facilities in the third highest benefit quartile. These differences were all statistically significant. Benefit levels were also significantly related to nurse aide turnover for Kansas facilities. Turnover for facilities in the third highest benefit quartile had nurse aide turnover that was 25 percent lower than facilities in the lowest benefit quartile. For RNs and LPNs, there was no relationship between benefit levels and turnover.

Evidence was mixed regarding the impact of staffing levels on turnover. In California, across all direct care staff, there was no relationship between total nursing hours per resident day. For nurse aides, turnover was lower at better staffed facilities, but the estimated impact was small. A one-hour change in nurse aides per resident day was associated with a turnover decrease of only 4 percent. In Kansas, contrary to our expectation, higher staffing levels were associated with higher, not lower, turnover levels. Each hour increase in total nursing hours per resident day was associated with a 10 percent increase in turnover. There was no relationship between staffing levels and nurse aide turnover. It was not possible to

investigate whether this is due to the greater number of staff in training that are presumably required at high turnover facilities.

We investigated the relationship between facility case mix and turnover, using the workload variable described in Chapter 3. We found no relationship between facility workload and turnover for facilities in California and Wisconsin. In Kansas, overall turnover and turnover among nurse aides was significantly higher in facilities with higher workload scores. Overall, these results do not provide support for the hypothesis that facility case mix is an important predictor of turnover.

Across all three states, turnover was significantly higher at for-profit facilities. The difference in turnover between for-profit and non-profit facilities ranged from 16 percent in California to 19 percent in Kansas and Wisconsin. None of the other measures of facility characteristics had a consistent relationship with turnover across the three states. In Wisconsin, turnover was significantly higher at facilities affiliated with a nursing home chain — no such relationship was found for California or Kansas. For Kansas, turnover was more than 40 percent lower at hospital-based facilities, but there was no difference in Wisconsin between hospital based and freestanding facilities. In California and Wisconsin, turnover was significantly lower at larger facilities, but there was no relationship between size and turnover for Kansas facilities.

The California data permitted analysis of nursing home staff retention. In general results for the retention models were consistent to those of the turnover models—measures associated with lower turnover levels were associated with higher staff retention. There was also a very strong relationship between facility size and retention, with retention rates much higher in larger nursing facilities.

In general, the county measures that we examined (urban/rural status, unemployment rate, per capita income), only the per capita income measure was related to turnover. In all three states, overall turnover was significantly higher in counties in the highest quartile in terms of per capita income relative to counties in the lowest quartile. Except in Wisconsin, where there was some evidence of higher turnover in areas with greater unemployment, county unemployment rate was not related to turnover. Adjusting for the other variables in the models, we found no difference in turnover rates between urban counties, counties adjacent to urban areas, and rural counties.

The overall statistical performance of the turnover models was modest — in most cases accounting for 20 percent or less of the variance in turnover levels. This suggests the potential importance of factors that we were not able to measure, such as the management practices described in the next chapter.

4.8 Policy Responses to Nursing Staff Shortages, Turnover and Retention Problems

4.8.1 Demographic Trends and National Policies

Although estimates differ of the increase during the next 40 years of those over 65 - or the subset of the elderly who are most likely to need long term care, those over 85 – there is no question that the increase is substantial and unprecedented (Stone, 2000). This will create an enormous demand for long term care services. As we have seen the demand for RNs is unlikely to be met by an aging RN workforce and projected enrollments in nursing programs, at least in the near term. The projected supply of people who provide the vast majority of informal care to noninstitutionalized elders, primarily wives or daughters, is also shrinking because of changes in family structure (e.g., childless couples, smaller family size) and increased labor force participation of those who provide the majority of informal care, wives and daughters (Noelker, 2001).

Several broad national (and state) policies will impact the future demand of a long term care workforce, either mitigating or exacerbating the projected problem. These include: welfare policies, including child care services and the potentiality of new labor force participants; unionization which could impact wages and workplace organization; health policies which might provide for more universal health care; educational policy, including incentives for enrolling more students in nursing programs; immigration policies which can impact the availability of more workers to the secondary labor market as well as foreign trained nurses. Future demand could be mitigated by changes in long term care practice that would permit the substitution of LPNs or NAs for work now being performed by RNs. Other more direct factors that could affect the future demand are changes in regulation (e.g., regulations which require higher staffing ratios) and reimbursement policies which may increase or reduce the available resources for nursing (Stone, 2001; Callahan, 2001; Noelker, 2001; Buerhaus et al, 2000).

There is no way of knowing if any new policies will be implemented in the above areas, the specifics of policies that may be implemented, and what is the likely net effect. What is clear, however, is that long term care is highly dependent upon public financing with the vast majority of funding coming from the Medicare and Medicaid programs. Given that the majority of nursing home costs are for labor, and profit margins/surpluses tend to be small, the current financing for long term care results “in a highly expenditure-constrained environment”(Caro and Kaffenberger, 2001). This does not mean that there are not important policy issues and options for public payment within this environment, as discussed in Chapter 11. In summary, these broad policy areas may be ultimately important, but provide no guide to effective near-term programs and policies (apart from public payment) that are currently being considered by states and providers.

4.8.2 State Programs/Policies

As a response to widely acknowledged problems in attracting a stable and well-trained direct-care workforce, several states have initiated activities directed to one or multiple objectives, including increasing CNA wages, improving staffing levels, improving CNA training, and some combination of commissions, taskforces, and studies. A state survey conducted by the Paraprofessional Healthcare Institute (PHI) and the National Citizens' Coalition for Nursing Home Reform (NCCNHR) in the summer of 2000 indicated that for the 40 states responding to the survey, 26 states have through legislation, regulation, or budget action, initiated changes related to minimum staffing ratios (PHI, 2000). Some of the state activities seem minimal, and others have adopted more comprehensive strategies. Massachusetts, for example, has recently passed a comprehensive bill that authorized funds for wage increases, pre-certification preparation and certification training, and career advancement demonstration projects (see Chapter 7 for more detail of the Massachusetts' program; also see Appendix B for a more detailed state-by-state description of initiatives).

Not only is there considerable variability among states in the selection of broad strategies, but there is considerable variation among states that choose to implement a given strategy. The North Carolina Division of Facility Services has conducted state surveys on the use of Wage Pass Throughs (WPTs) to improve recruitment and retention of direct care workers. In general states with WPTs "...designate that some portion of a reimbursement increase for one or more public funding sources for long-term care must be ... used specifically to increase wages and/or benefits for aide workers." A 1999 and 2000 follow-up survey found that a total of at least 18 states have initiated WPTs (North Carolina Division of Facility Services, 2000; see the Appendix B). The WPTs differ among the states with respect to the specific setting (nursing homes or home care), the specific target group (e.g., aides and other front line staff), whether providers are given flexibility in distributing the wage increases, and accountability procedures (Harmuth, 2001).

The 14 states responding to the follow-up survey varied in their perception as to the effectiveness of the WPTs. All 14 responding states indicated that aide recruitment and retention was still a problem, and only 33% indicated that the WPT had or probably had a positive impact. More importantly, none of the states have implemented an evaluation that could provide a reasonable assessment of effectiveness. Any change in turnover, positive or negative, could be due to other concurrent changes, such as changes in unemployment. Two states have apparently monitored changes in nurse aide turnover rates. Michigan has had a WPT in place for nursing homes since 1990. Aide turnover rates have dropped 74.5% in 1990 to 67.45% in 1998. This is not a particularly large decrease and very difficult to attribute to the WPT. In Kansas most facilities chose to use the funds to raise the wages of frontline staff. The second most common use was to pay for bonuses. The pass-through program facilities reported an annualized turnover rate of 107% for the period from July 1, 2000 through March 31, 2001. This was only slightly less than the turnover rate of 120% for *all* Kansas nursing facilities in 1998. Given that the participating facilities may not be comparable to all facilities taken as a group, that the years of the comparison differ, and other

concurrent changes could also affect turnover, there is little that can be concluded as to effectiveness (Kansas Department on Aging, 2001).

Apart from the experiences and limited data reported by the states, there are good reasons to doubt the effectiveness of Wage Pass Throughs. First, depending on how the WPTs are implemented, the increase may not accrue to all facilities, to current NAs as opposed to new hires, and may not be sufficiently large to impact the decision to leave. Second, as we have discussed in the above qualitative study (Bowers et al, 2001), pay increases can be implemented in ways that are interpreted by CNAs as dismissive of them personally and professionally; depending on implementation, a wage increase may not impact the decision to leave. The Pennsylvania study discussed above found that entry-level or starting wages had little effect on recruitment problems, but large increases in wages after a probationary period had a large effect. Third, although the quantitative analysis of turnover with newly available data that was presented above found a strong relationship in California facilities between NA wage rates and turnover, in Kansas turnover rates were actually somewhat higher at higher paying facilities. Our results suggest that increases in benefit levels may be a more effective way to reduce turnover.

In summary, we find a broad array of state programs to address perceived causes of the widely acknowledged problems of turnover and retention of front-line nursing staff, but the absence of evaluations which would permit even tentative assessments of effectiveness.

4.8.3 Private Initiatives

Among providers, professional associations, and provider networks, there has been a widespread diffusion of organizational precepts and management practices that are viewed as improving quality of care, including retaining NAs. In addition to the importance of wages and benefits, discussed above, other social supports include transportation and child care. Most important, there is an emphasis upon job redesign and organizational changes. Specific elements include the creation of career ladders and ongoing training to increase nurse aide commitment and improvement of knowledge and skills; enhanced autonomy consistent with recognized importance of the work; relative permanent assignment of the NA to a group of residents; involvement of the NA in determining and managing residents' care.

For some a number of organizational changes have been self-consciously adopted as a management philosophy, often with linkages to other nursing homes. For example, in the Eden Alternative homes (Thomas, 1994), there is an emphasis upon a less medicalized environment, one which reduces the all too common "loneliness, helplessness and boredom." This organization change seeks links to the larger community and the creation of an environment with children, animals, and gardens. Alternatively, Wellspring, a consortium of eleven freestanding nursing homes has developed a model "... based on the idea that management should foster quality of care with appropriate policies, but decisions on policy implementation should be left to the front-line worker who are most familiar with residents'

needs.” A more detailed description of these and other various models can be found in Stone (2001) and the GAO (2001).

However intuitively appealing these “best practice” interventions appear, no systematic evaluations have been completed, although a number are currently under way. Second, as demonstrated in the work of Bowers et al (2001) discussed above, there are no necessary linkages between a good practice in principle and effective implementation. For example, Banaszak-Holl and Hines (1996), contrary to the “best practices” listed above, found that turnover rates were unaffected by increases in aide training and the extent of aide involvement in resident assessments. They speculate that increased training must also be linked to changes in job structure and actual work autonomy and better career opportunities before there is an impact on turnover. Third, even if forthcoming evaluations of some of the comprehensive management models are demonstrated to be effective, there remains the question of whether these models can be replicated in more typical facilities with less resources, skill, and commitment.

4.8.4 Summary/Conclusions

This and following chapter on nursing staff turnover and retention, as well as other chapters in this report, recognize that staffing ratios are only a part of the complex relationship between staffing and quality of nursing home care. Other aspects of the relationship, such as staff allocation among units and shifts, staff knowledge and training, staff supervision, staff turnover and retention, and management practices are also important, although not easily quantified. The current nursing workforce shortage and recruitment and retention problems are viewed as mutually reinforcing with both impacting negatively on quality of resident care.

As intuitively obvious as these presumed relationships may appear, the supporting evidence is rather slim. This is due, in part, to the absence of a national data sources for turnover, and the accuracy of the data for the smaller samples that are reported in the research literature. In many of the studies, the statistical models are weak. And it is possible that the relationships do not exist, or more likely, they are much weaker than presumed. Despite the general absence of direct evidence, there is a compelling rationale on the relationship between staff shortage and turnover/retention and the impact of both on resident quality of care. It is argued that high turnover compromises the continuity of care and supervision of staff. Further, several qualitative studies of nursing aides have pointed to the common perception of insufficient time to do needed care processes, not performing (“cutting corners”) essential tasks, and the consequence stress and motivation of nursing aides to leave their jobs.

What is not in doubt, however, is that the current level of turnover is quite high compared to other occupations, with several studies pointing to RN and NA turnover rates above 50 percent and 100 percent, respectively. Statistical quantitative studies have pointed to the importance of wages, benefits, staffing levels, facility characteristics, and local labor market and economic conditions. This chapter analyzed the impact of these factors on turnover with

newly available 1999 turnover data for three states—California, Kansas, and Wisconsin. Relative to other sectors of the labor force, turnover rates in all three states were high, especially for nurse aides. Additionally, there was considerable variation in turnover levels across facilities. Evidence was mixed regarding the impact of wage rates on turnover. In California, however, turnover was significantly lower at facilities with higher nurse aide wage rates. Benefit levels appeared to impact turnover much more than wage rates. Evidence was also mixed regarding the impact of staffing levels on turnover. Across all three states, turnover was significantly higher at for-profit facilities. Among the county level measures examined only the per capita income measure was related to turnover.

The findings and other considerations discussed in the chapter suggest that a number of state programs and policies – e.g., Wage Pass Throughs (WPTs) and higher minimal staffing requirements – are unlikely to significantly reduce turnover. However, overall statistical performance of the turnover models was modest—in most cases accounting for 20 percent or less of the variance in turnover levels. This suggests the potential importance of factors that we were not able to measure, such as the management practices described in the next chapter. Many of these “best practices” emphasizing job redesign and organizational changes – creation of career ladders, ongoing training, enhanced autonomy, relative permanent assignment of the NA to a group of residents, involvement of NAs in determining and managing residents’ care - have been widely known to providers. However sound these management principles may be, qualitative studies suggest that their effectiveness depends upon how they are implemented. And no systematic evaluations have been completed, although several are currently underway. Even if forthcoming evaluation of some of the most comprehensive “best practices” management models are demonstrated to be effective, there will remain the question of whether these models can be replicated in more typical facilities with less resources, skill, and commitment.

Notwithstanding the above cautions, there is evidence supporting optimism about the potential effectiveness of these private initiatives to improve quality, staff recruitment and retention. The three state analysis demonstrated considerable variability in turnover and retention among facilities within each state. Not only is there considerable variability within the examined states, but also within the same local labor market. Thus it appears that the local labor market and other economic factors, while contributing to the generally high level of turnover, are not inconsistent with finding considerable variability within the same market. Most important, there is evidence that this within labor market variability appears to be significantly affected by management practices consistent with many of the “best practices” described above. The supporting evidence is found in the qualitative case studies of the next chapter.

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